

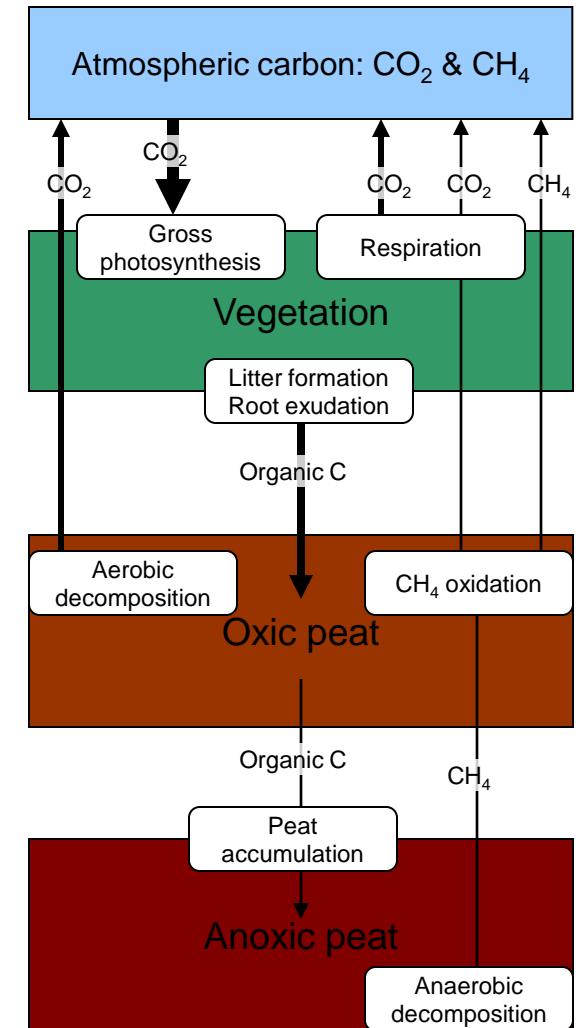
Hydrologic Controls on Ecosystem Respiration in the Everglades Ridge Slough

GEER 2010
Danielle Watts
Matt Cohen



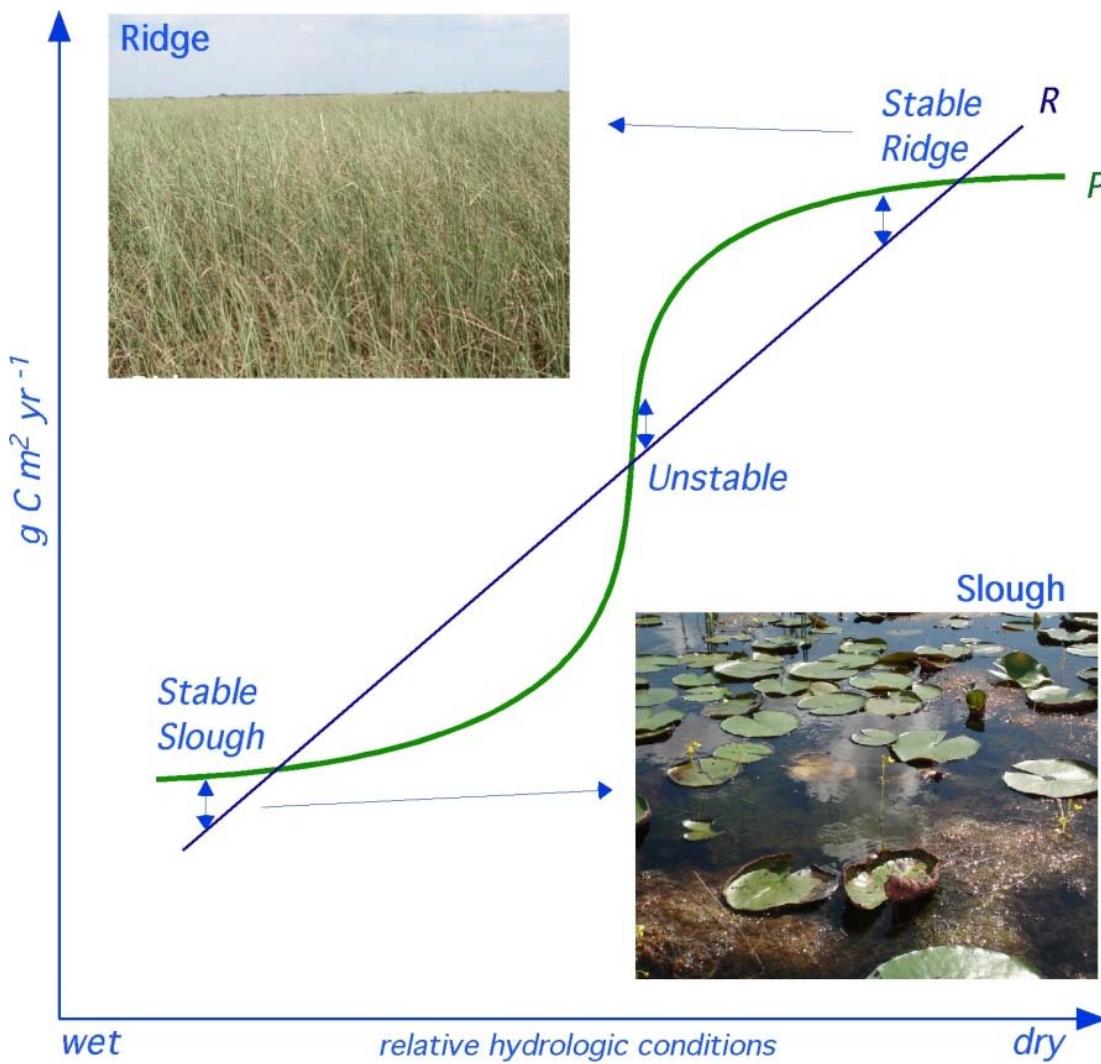


Carbon budgets lead to peat accretion.



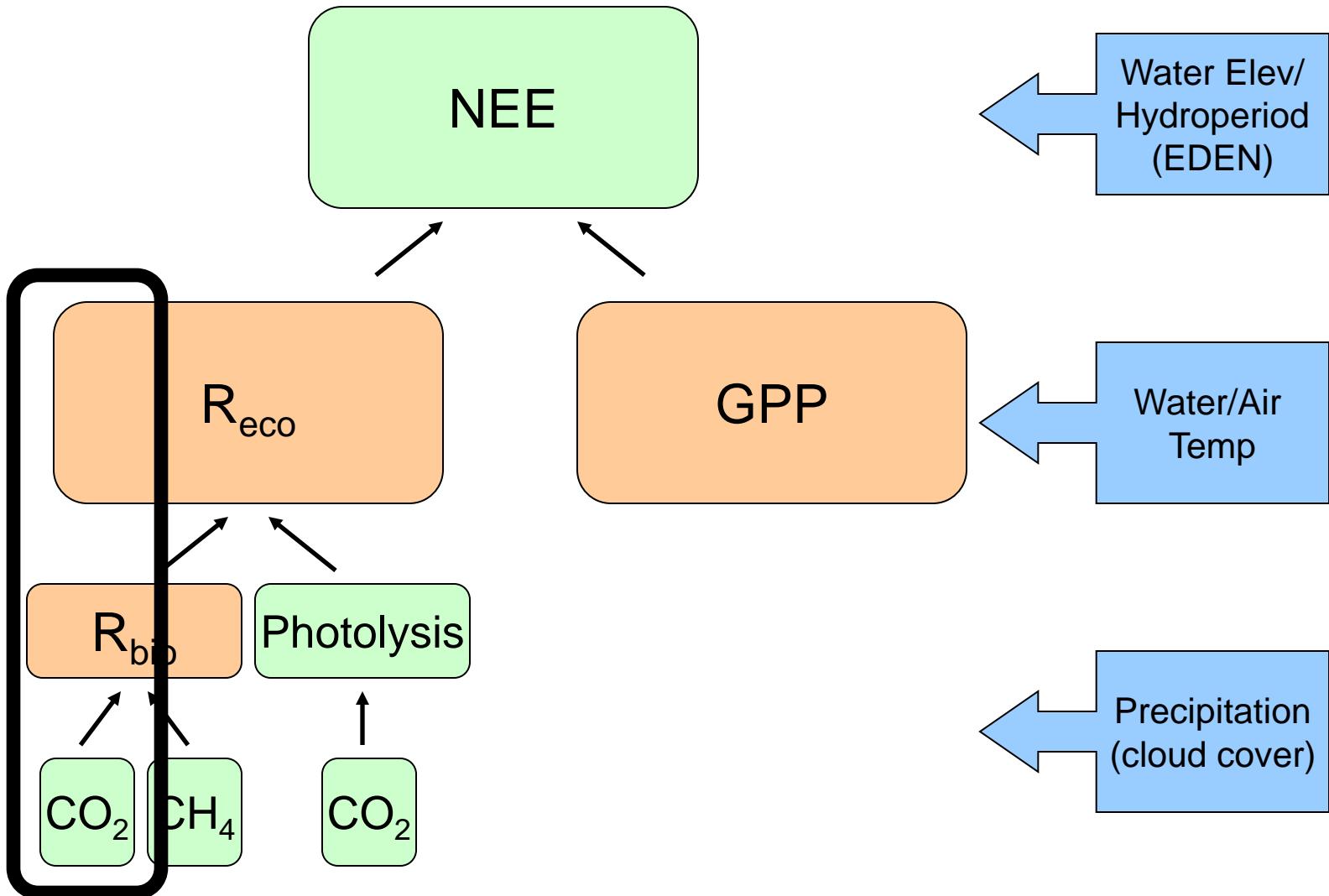


Ridges and sloughs act as alternative configurations to carbon budgets.





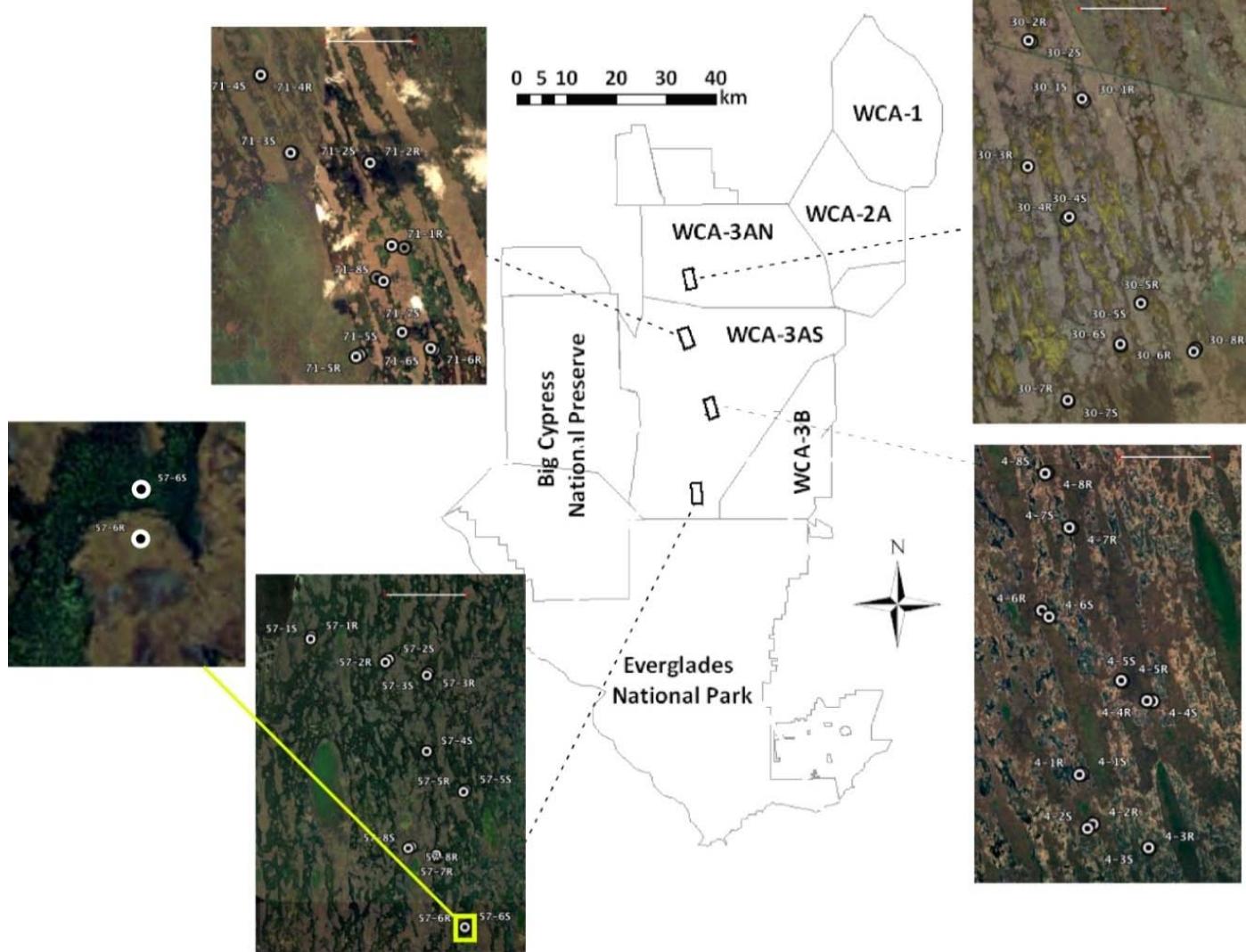
Peat accretion is the result of biotically-mediated carbon fluxes



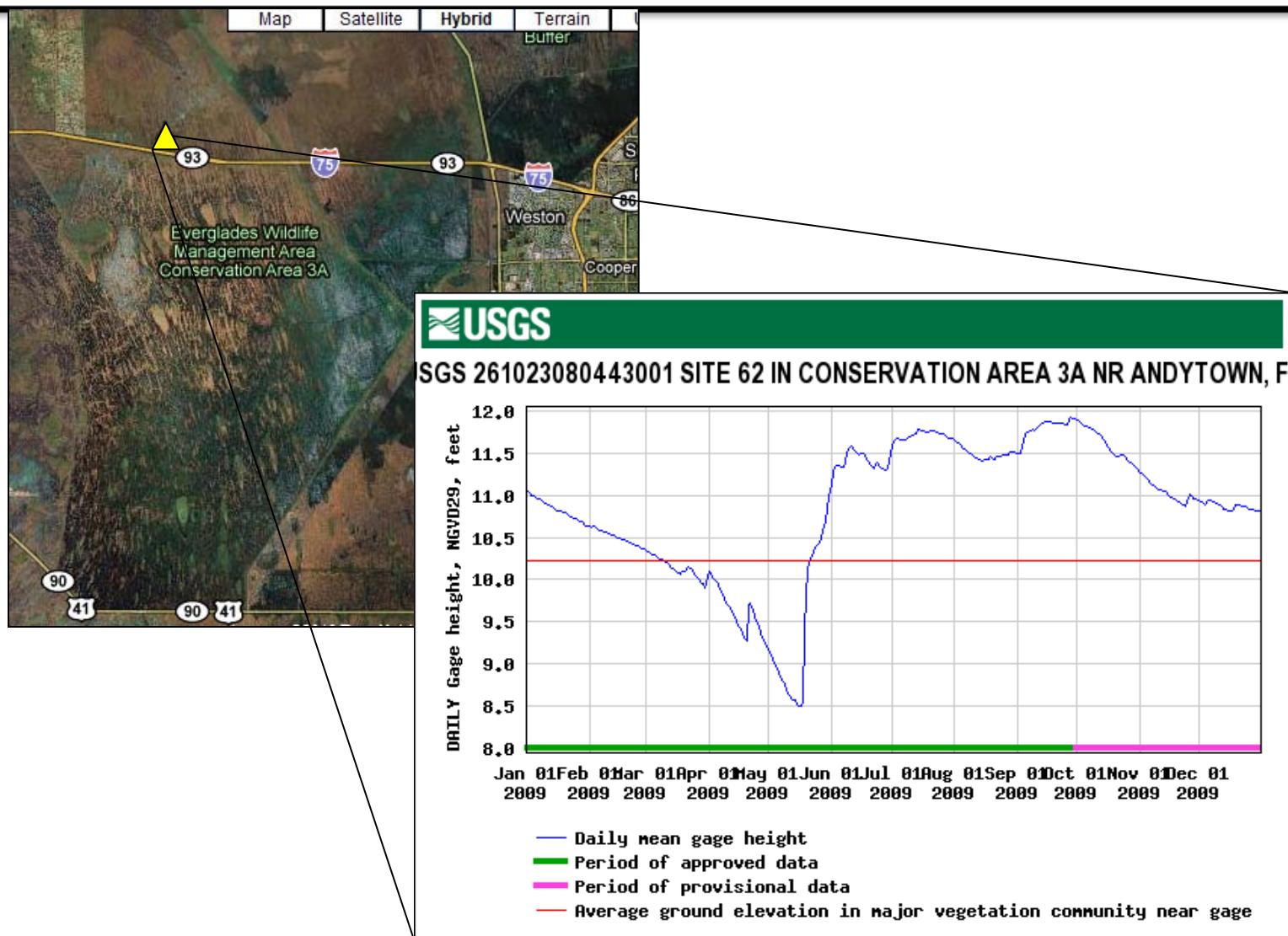
Closed system for respiration.



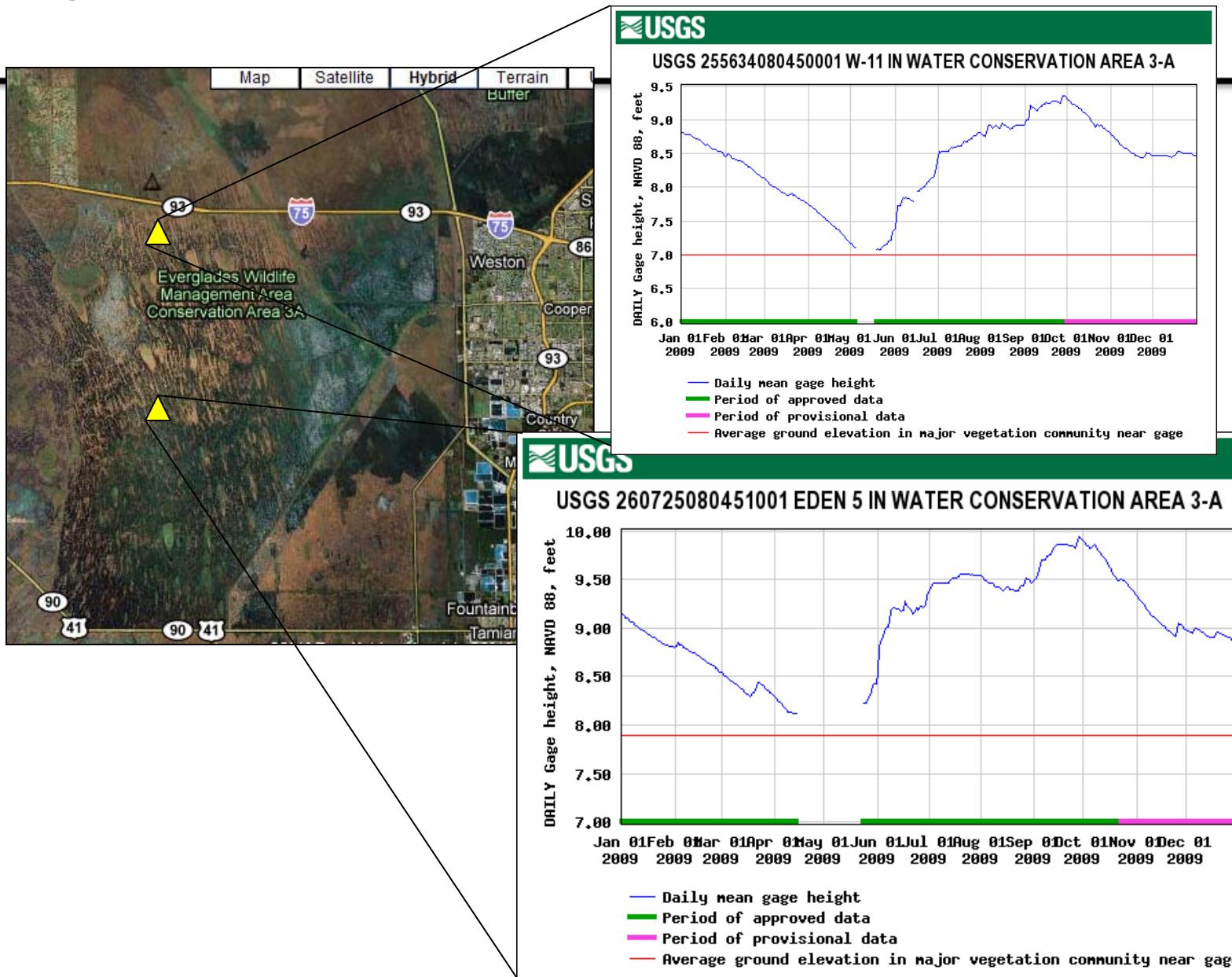
WCA 3A's hydrologic gradient spans the drained to impounded.



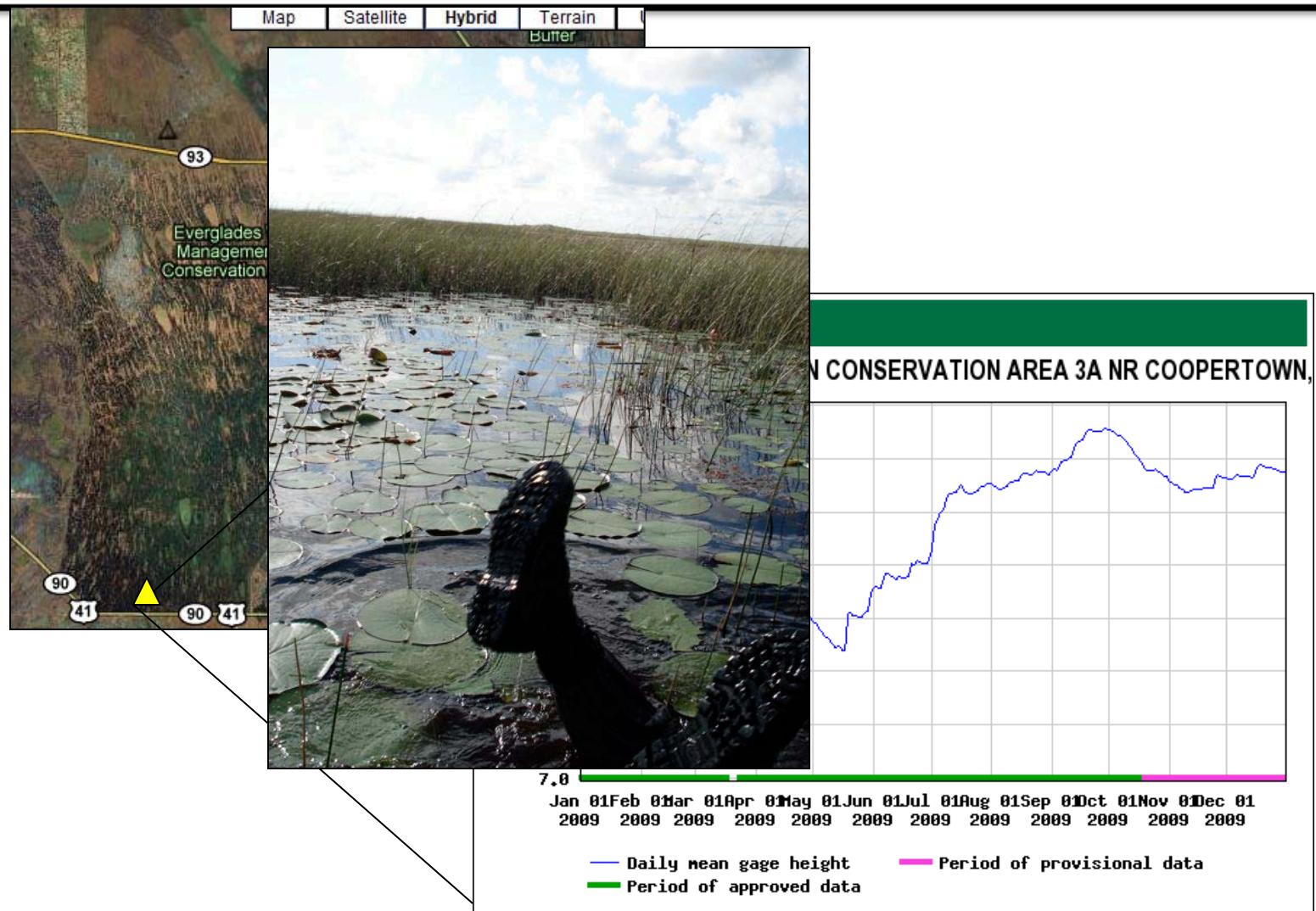
Drained.



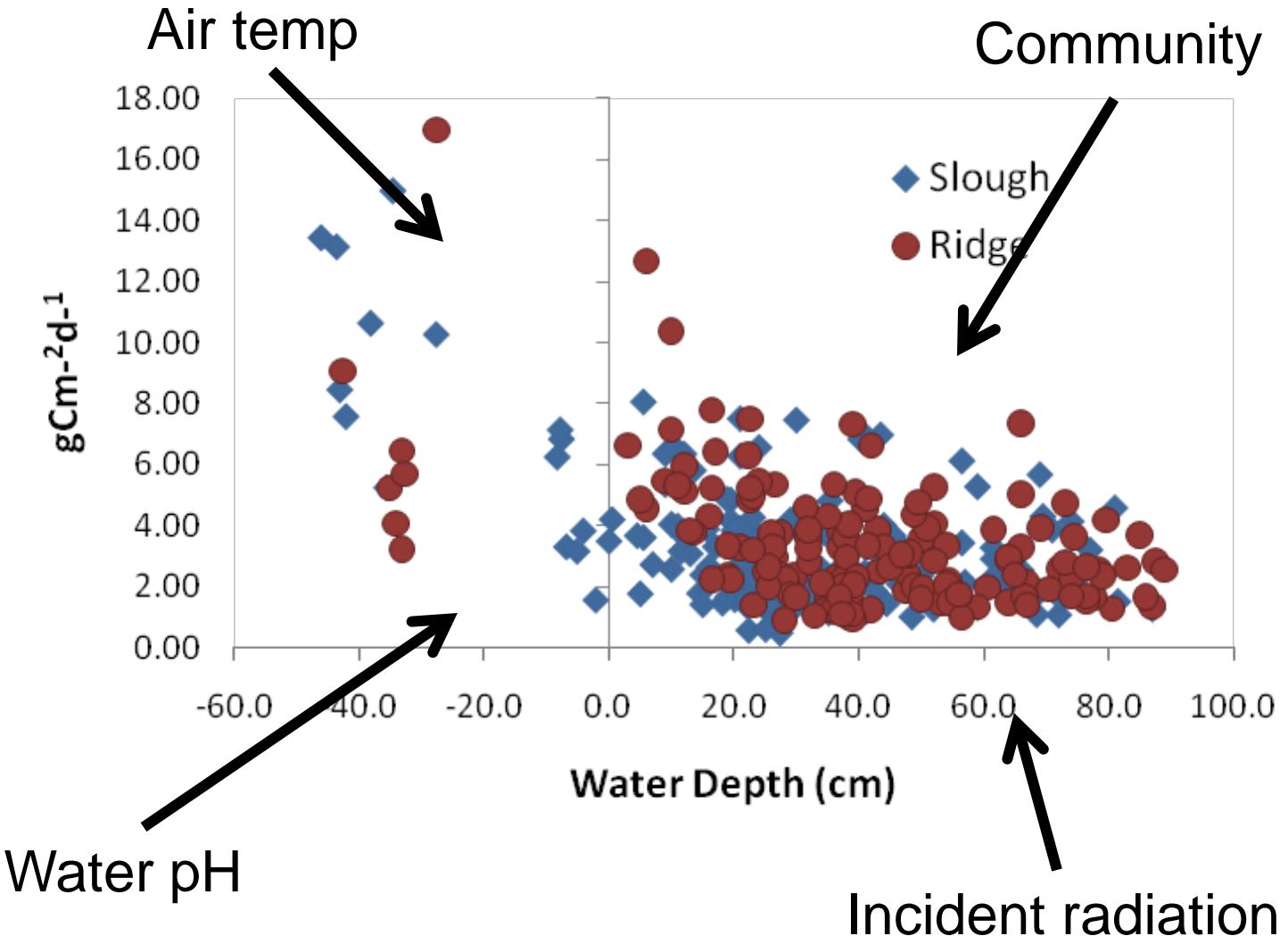
Conserved.



Impounded.

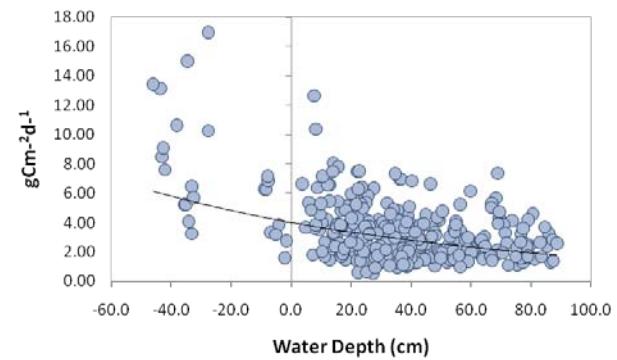
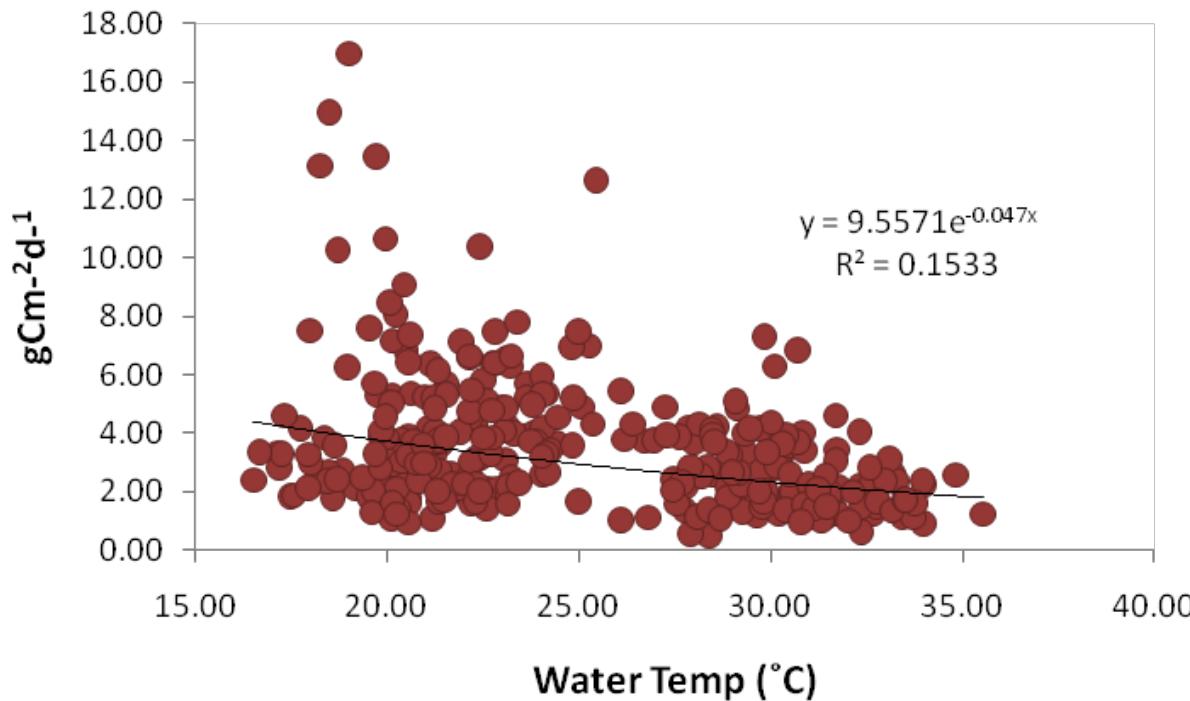


Daily CO₂ efflux.



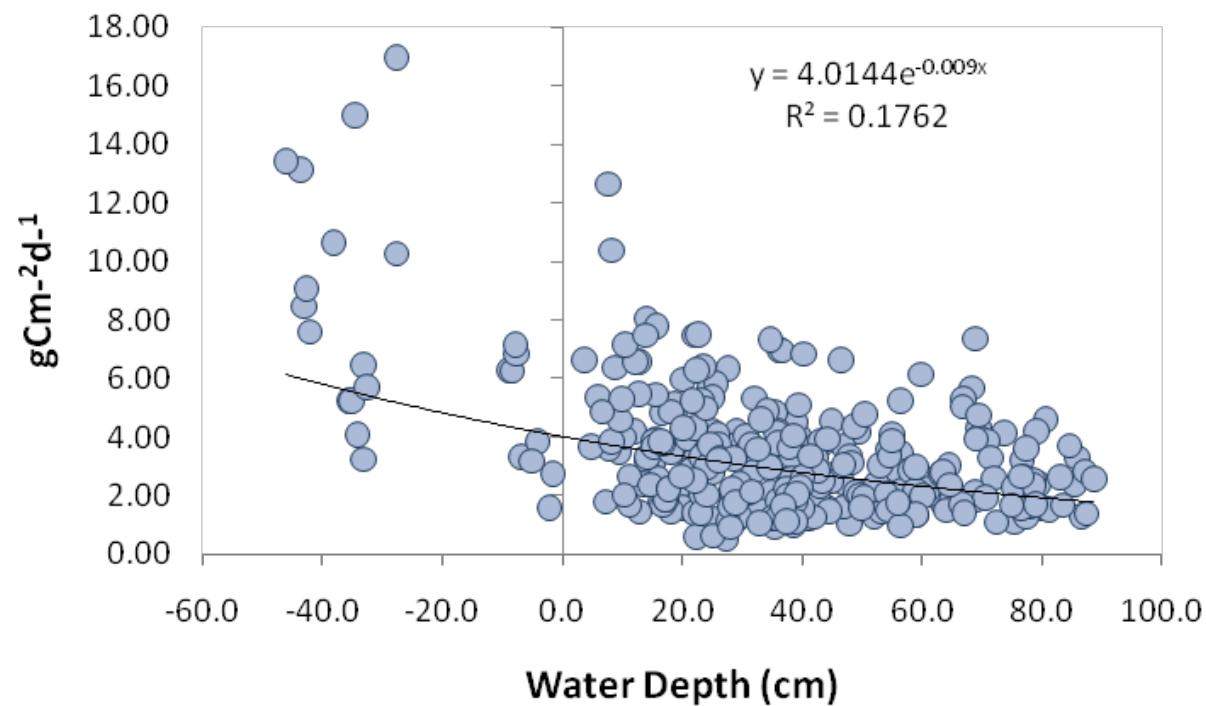
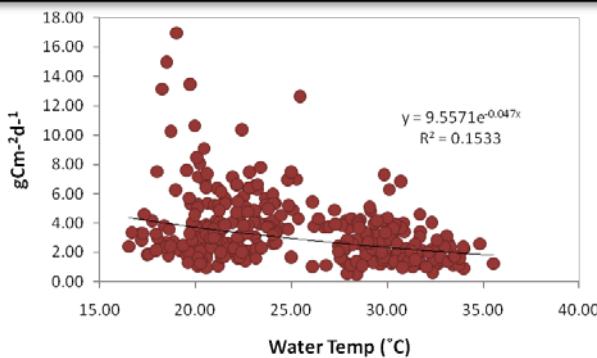


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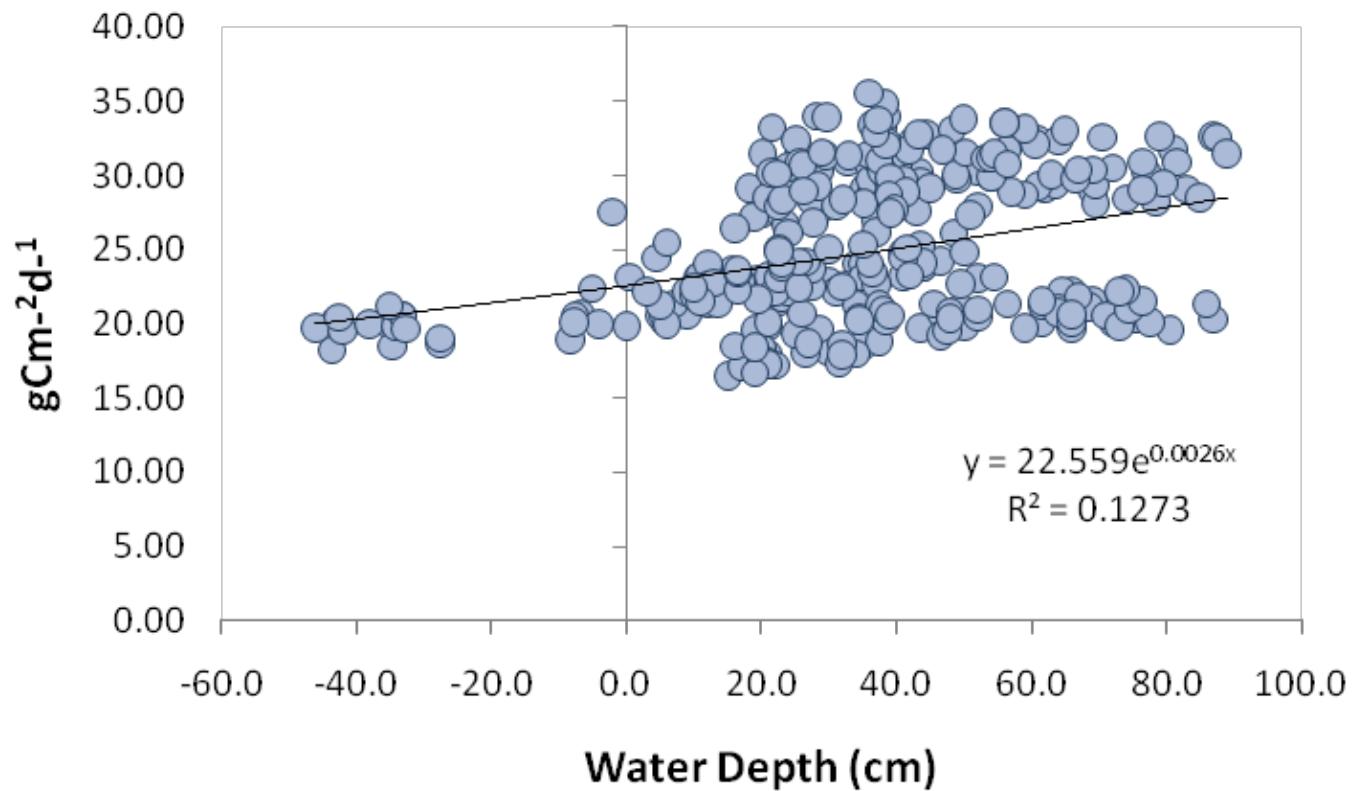




Daily CO₂ efflux.

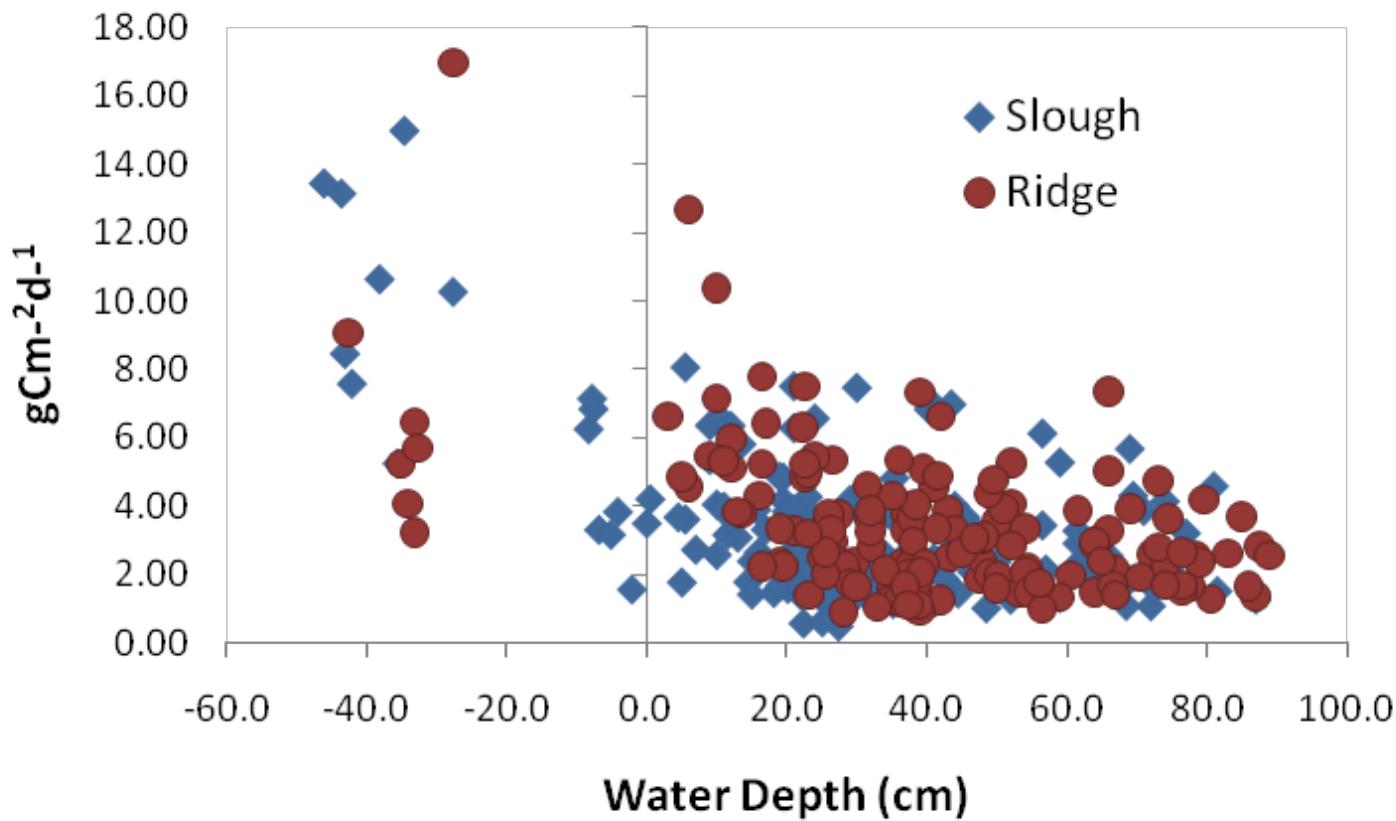


Daily CO₂ efflux.



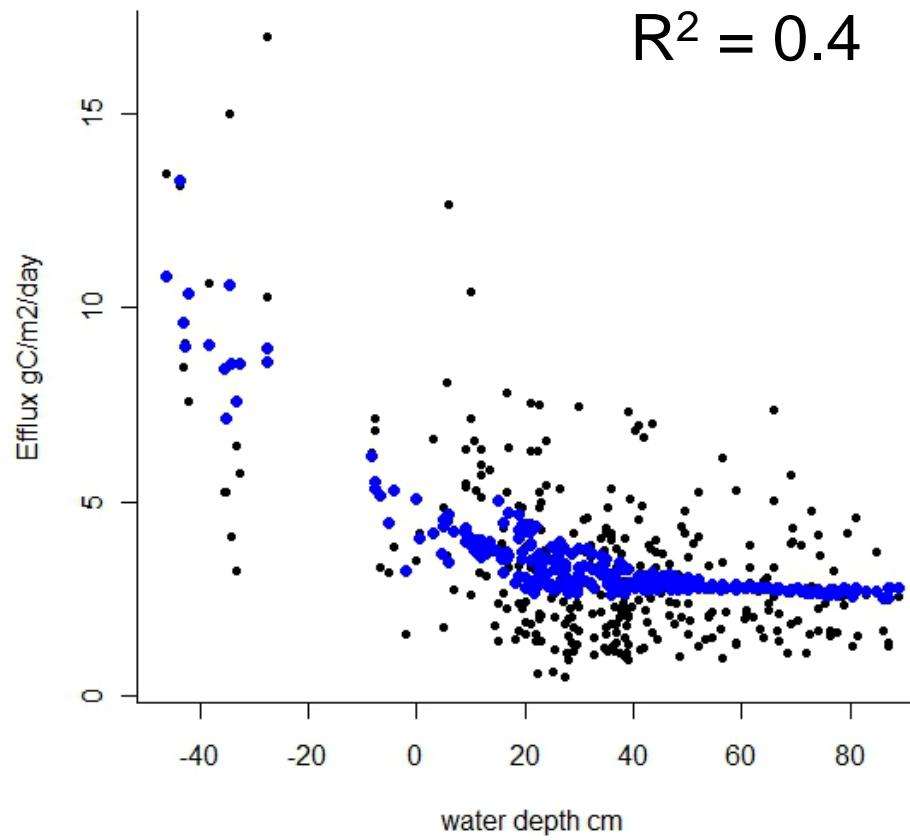


Daily CO₂ efflux.



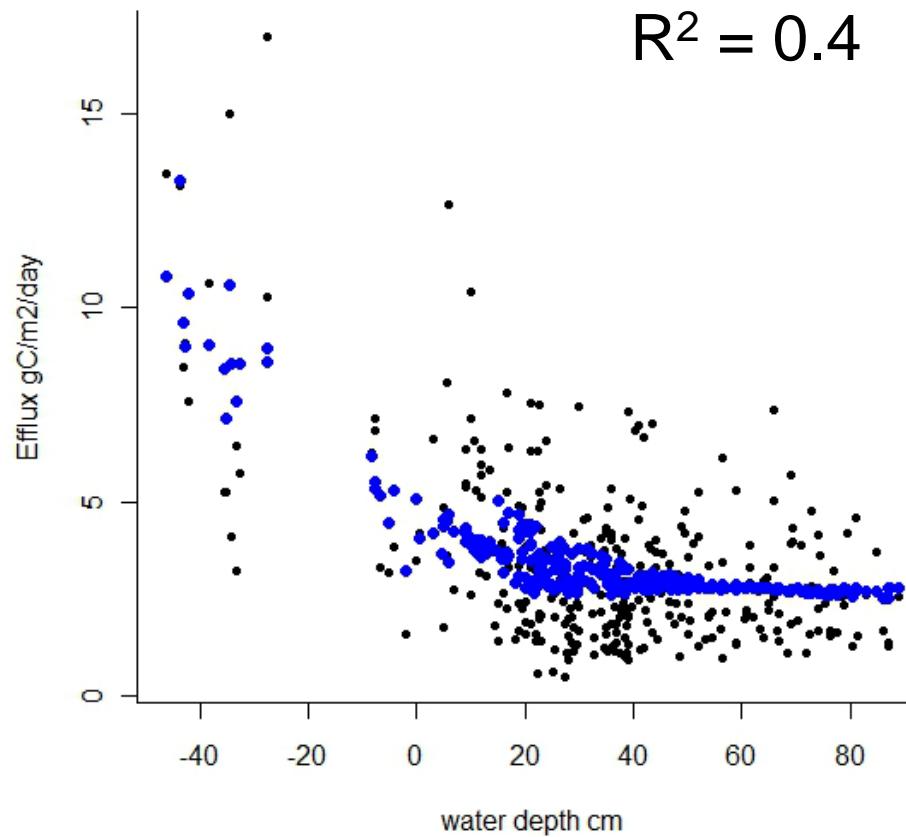
Best-fit model is only OK.

$$\text{Efflux} = K e^{-a \text{ temp}} e^{-b \text{ water}} e^{c \text{ temp} \times \text{ water}} + e$$



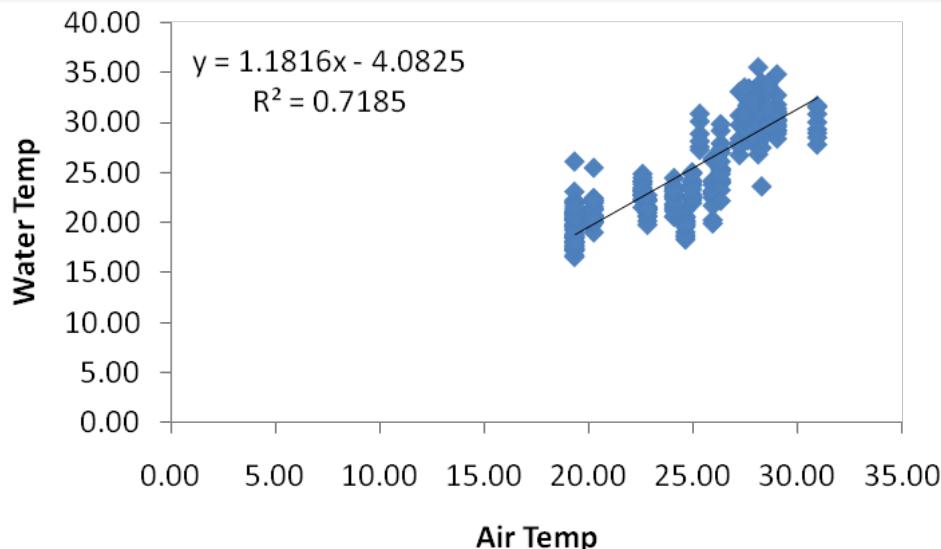
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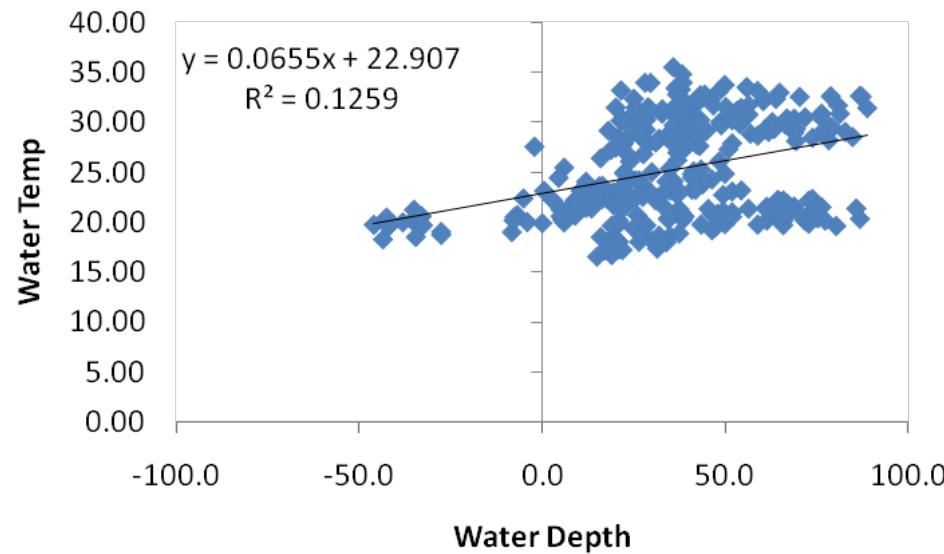




Modeling water temperature.



Combined with
interaction,
 $R^2 = 0.85$



Drawing inference...



Ecosystems
DOI: 10.1007/s10021-010-9356-2

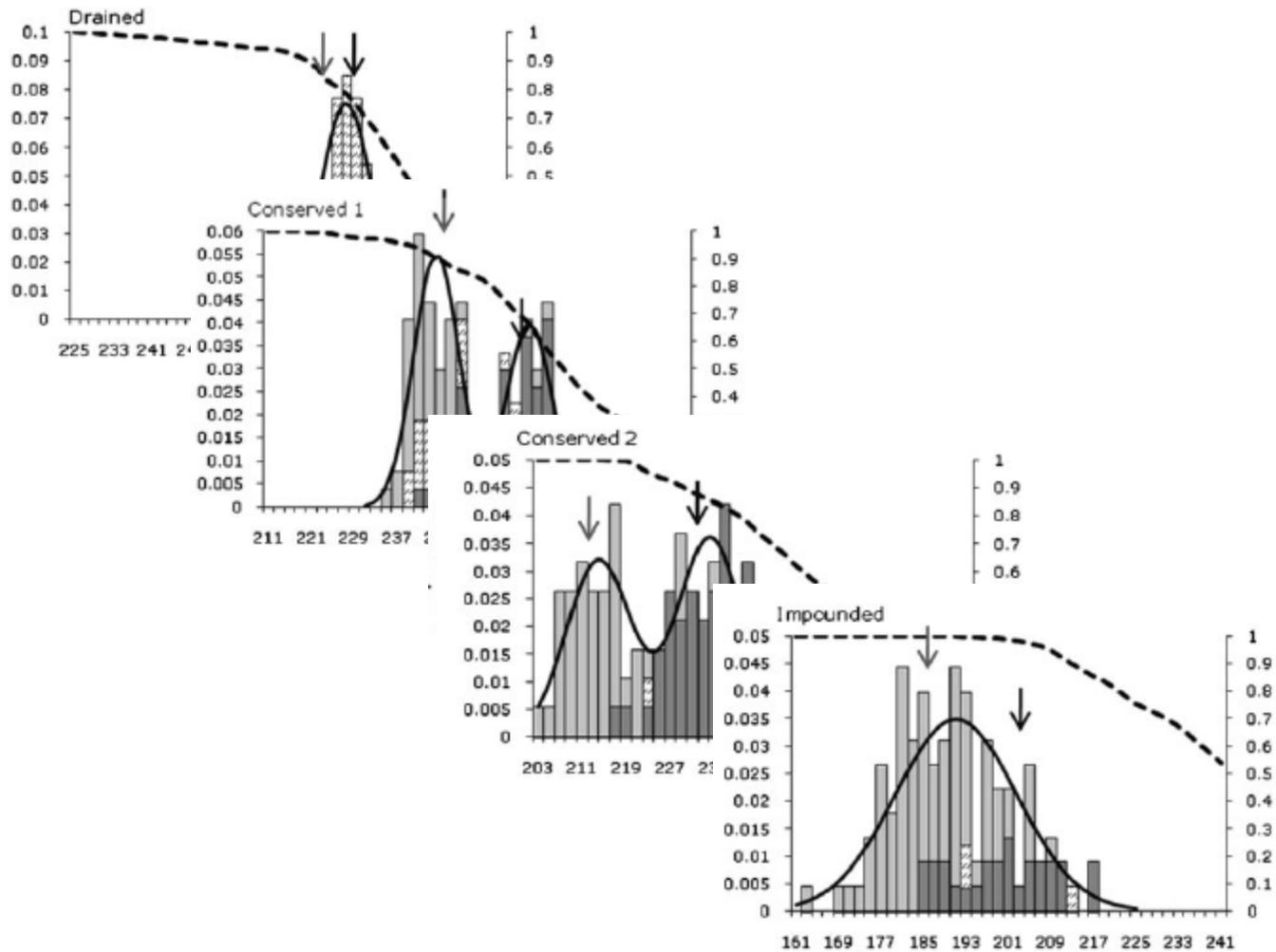
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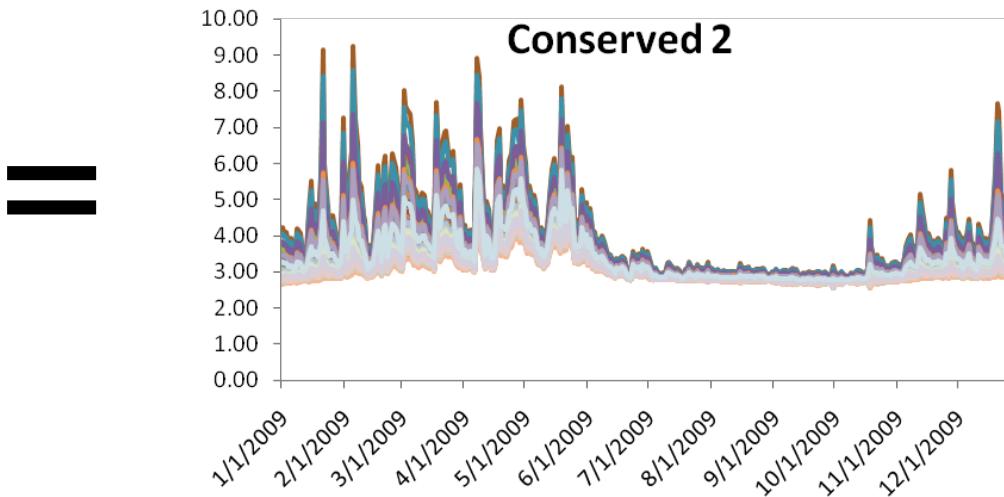
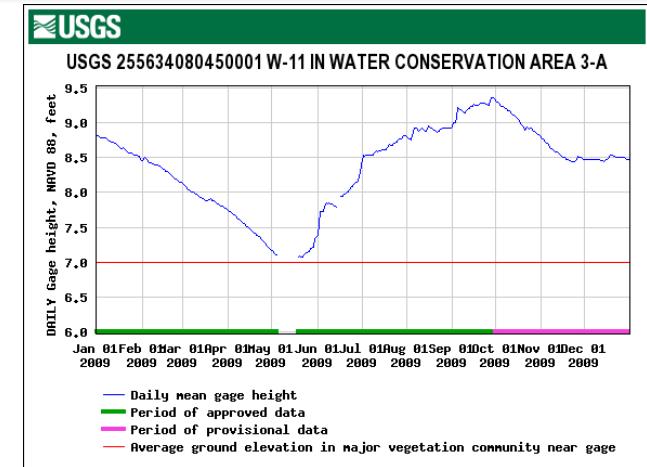
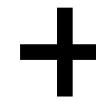
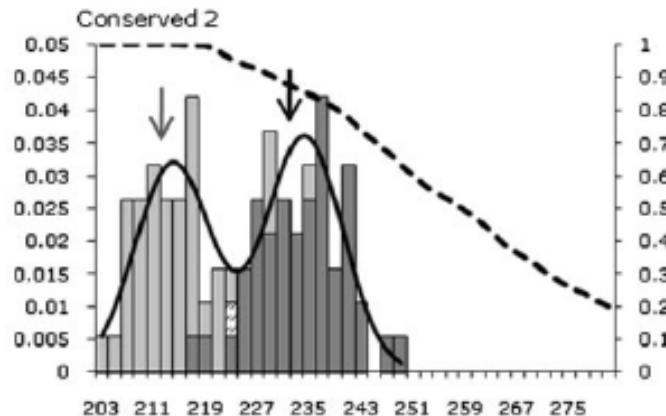
1 Hydrologic Modification and the Loss 2 of Self-organized Patterning 3 in the Ridge–Slough Mosaic 4 of the Everglades

Danielle L. Watts,¹ Matthew J. Cohen,^{2*} James B. Heffernan,³
and Todd Z. Osborne⁴

Peat elevations in each landscape block.

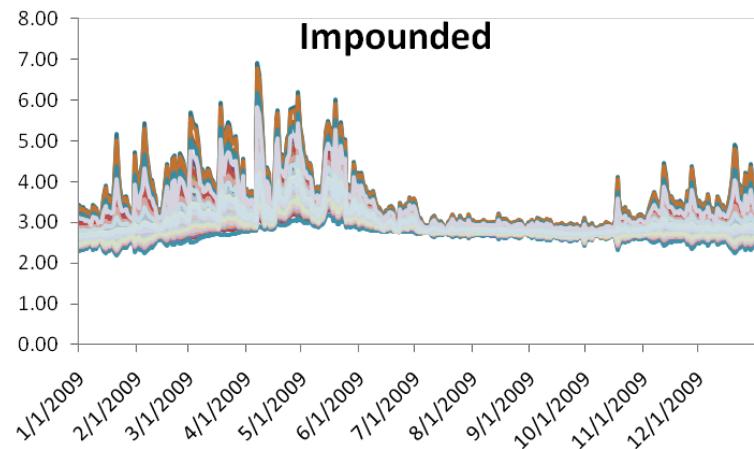
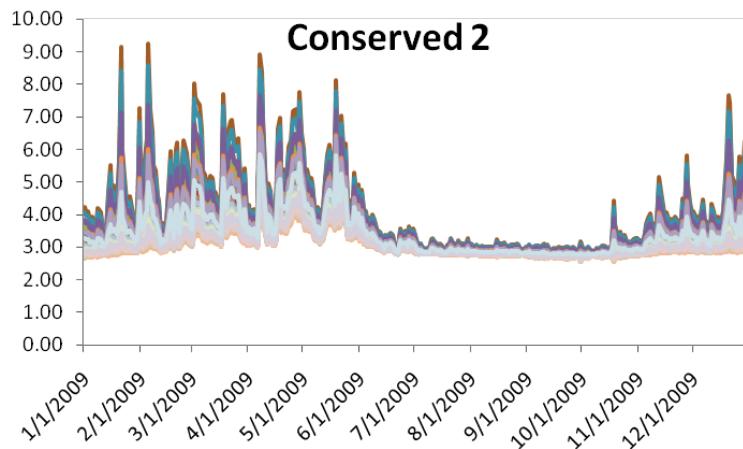
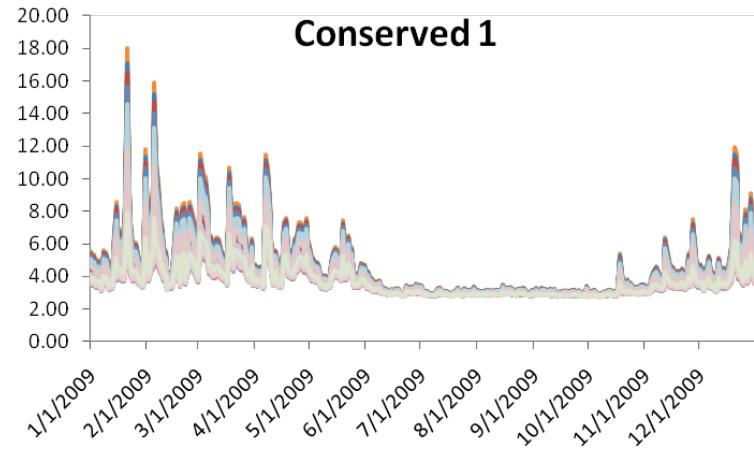
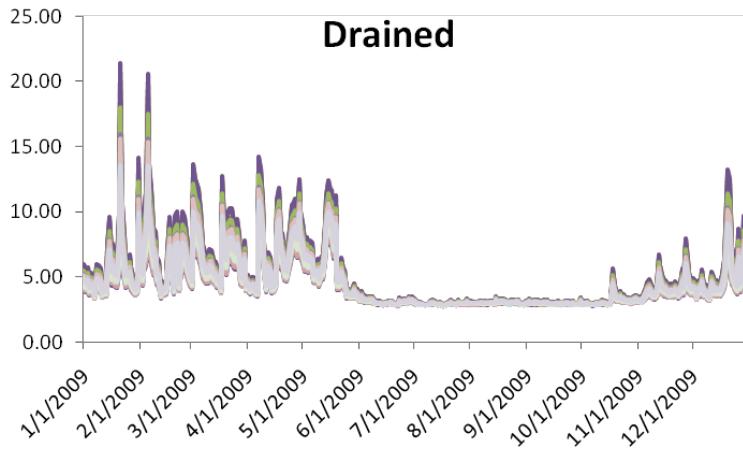


Combining measured elevations with Eden and FAWN data gives annual respiration rates.



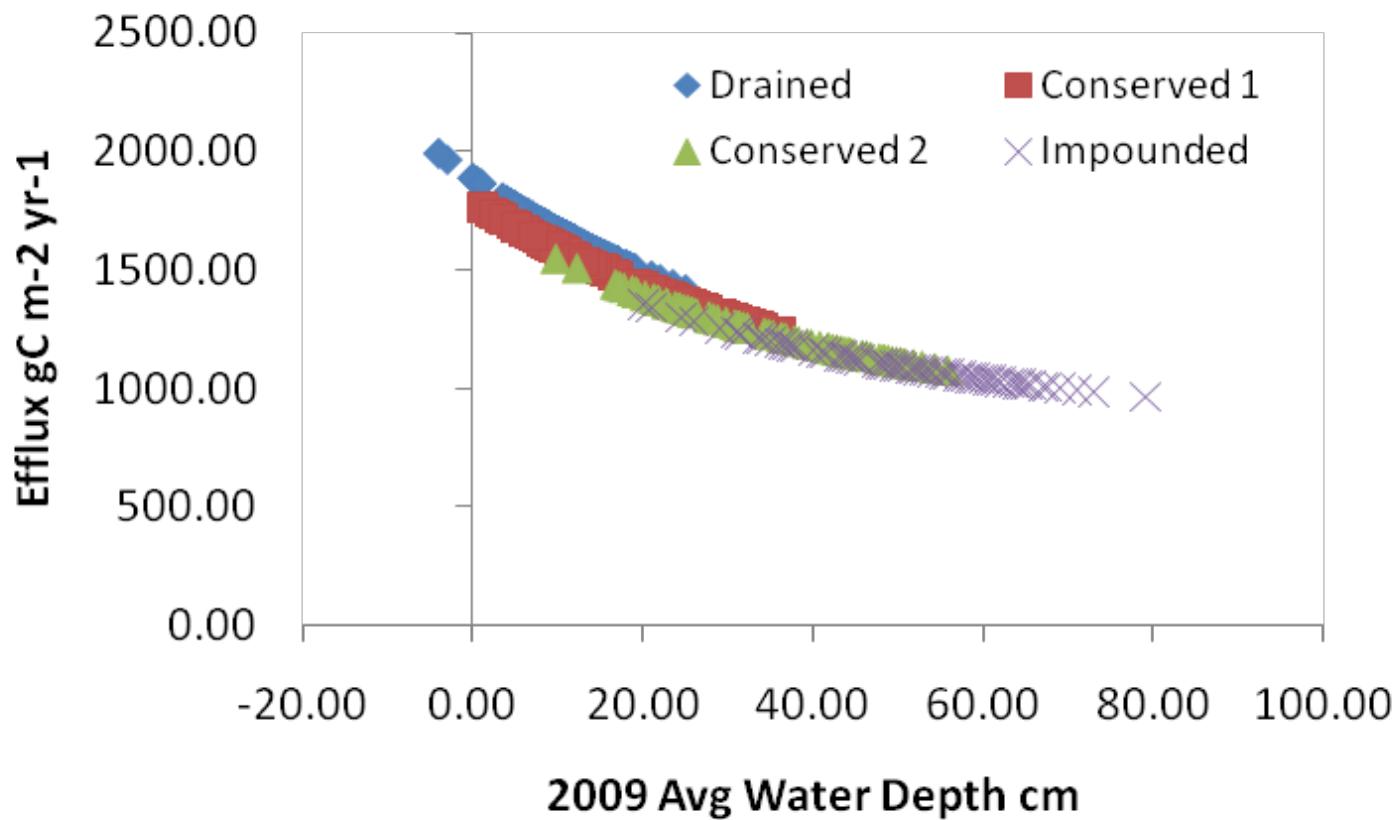


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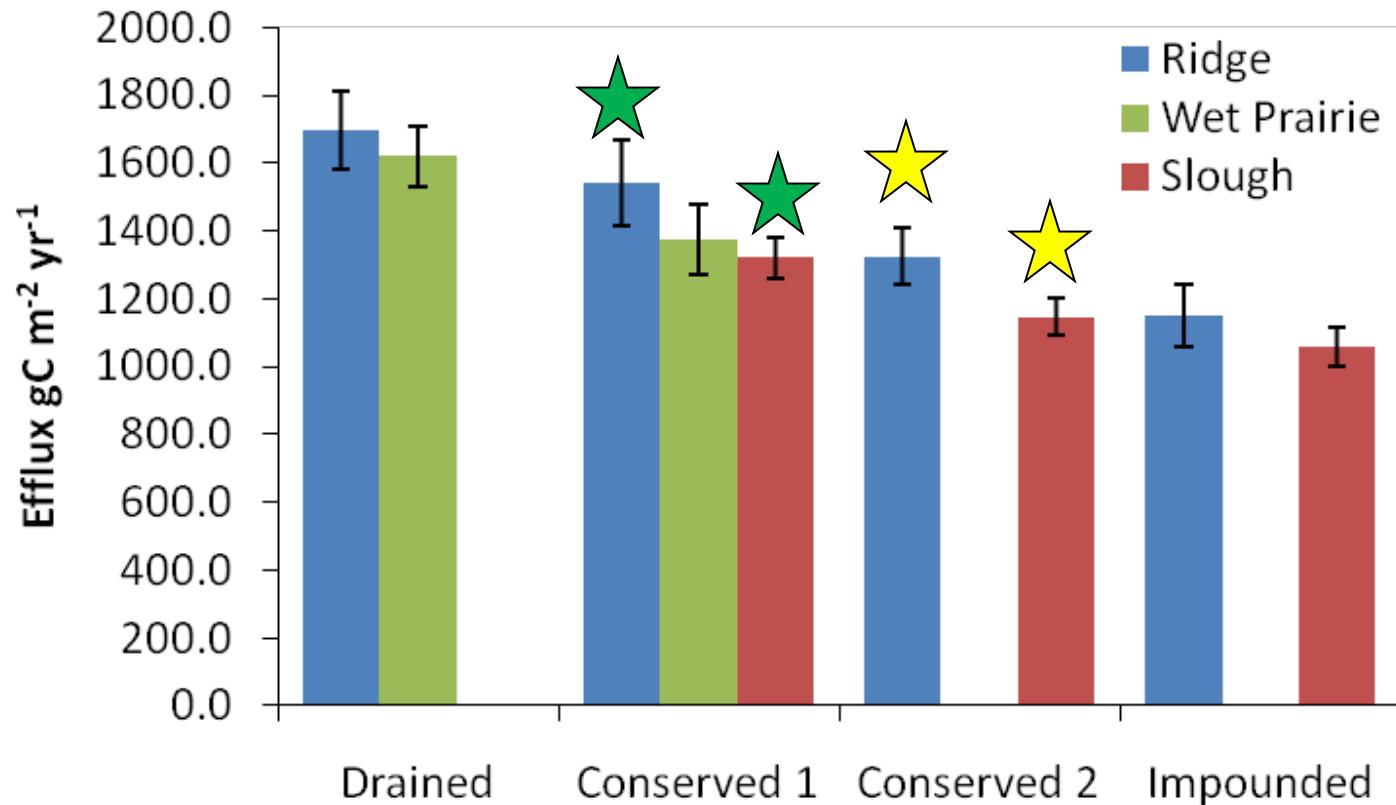


Clear monotonic relationship with water depths.



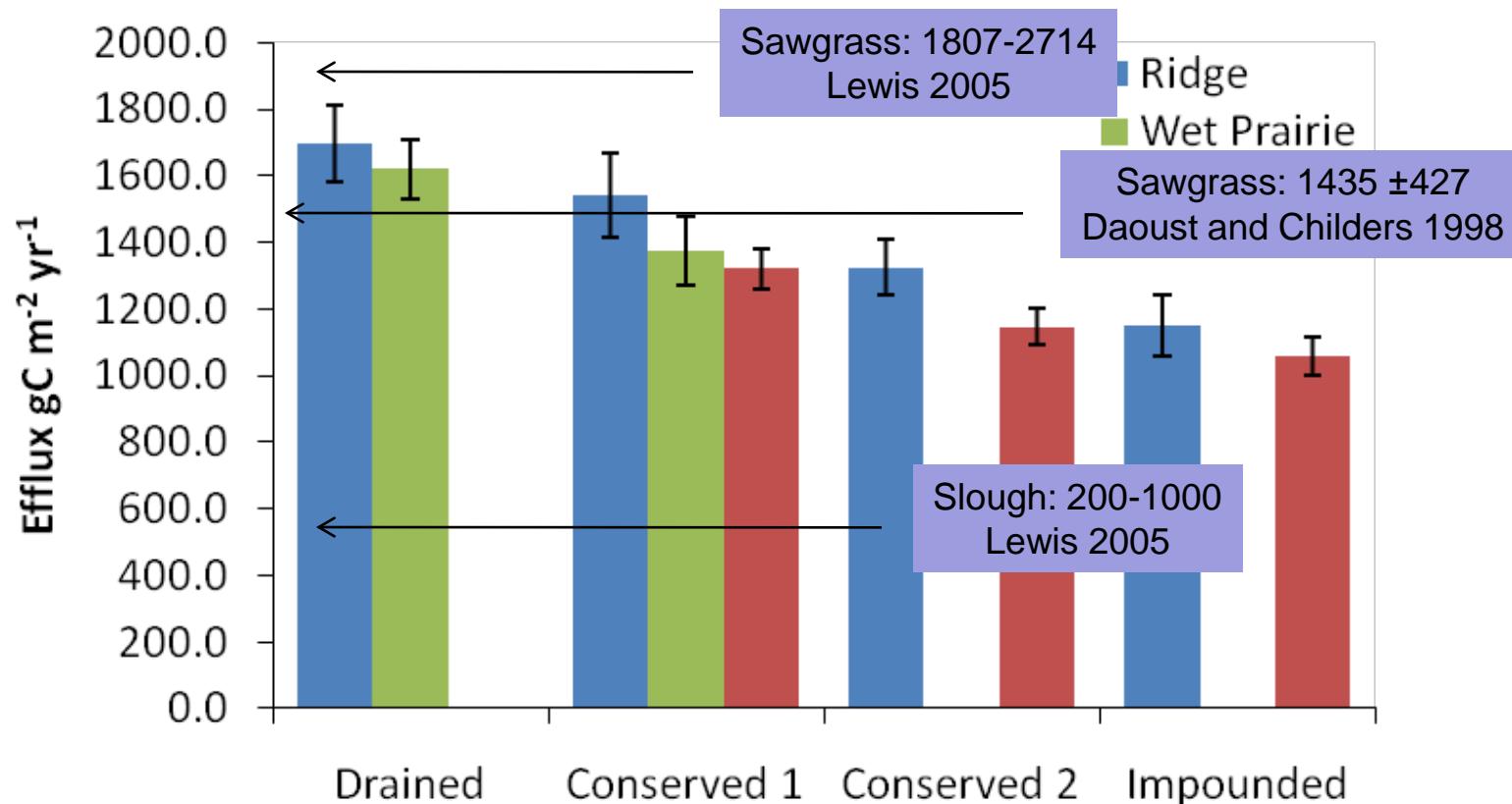


Communities and respiration.



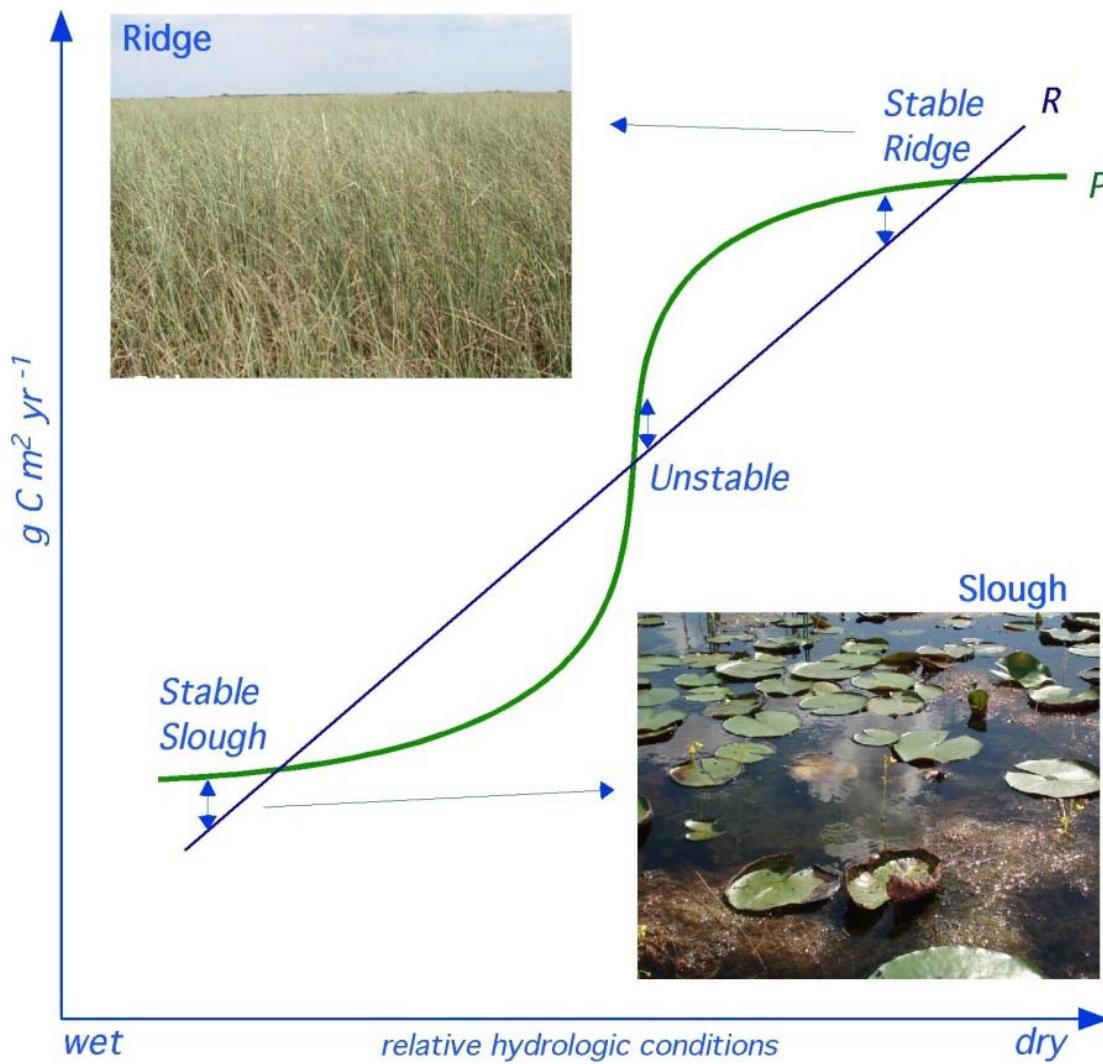


Literature productivity.



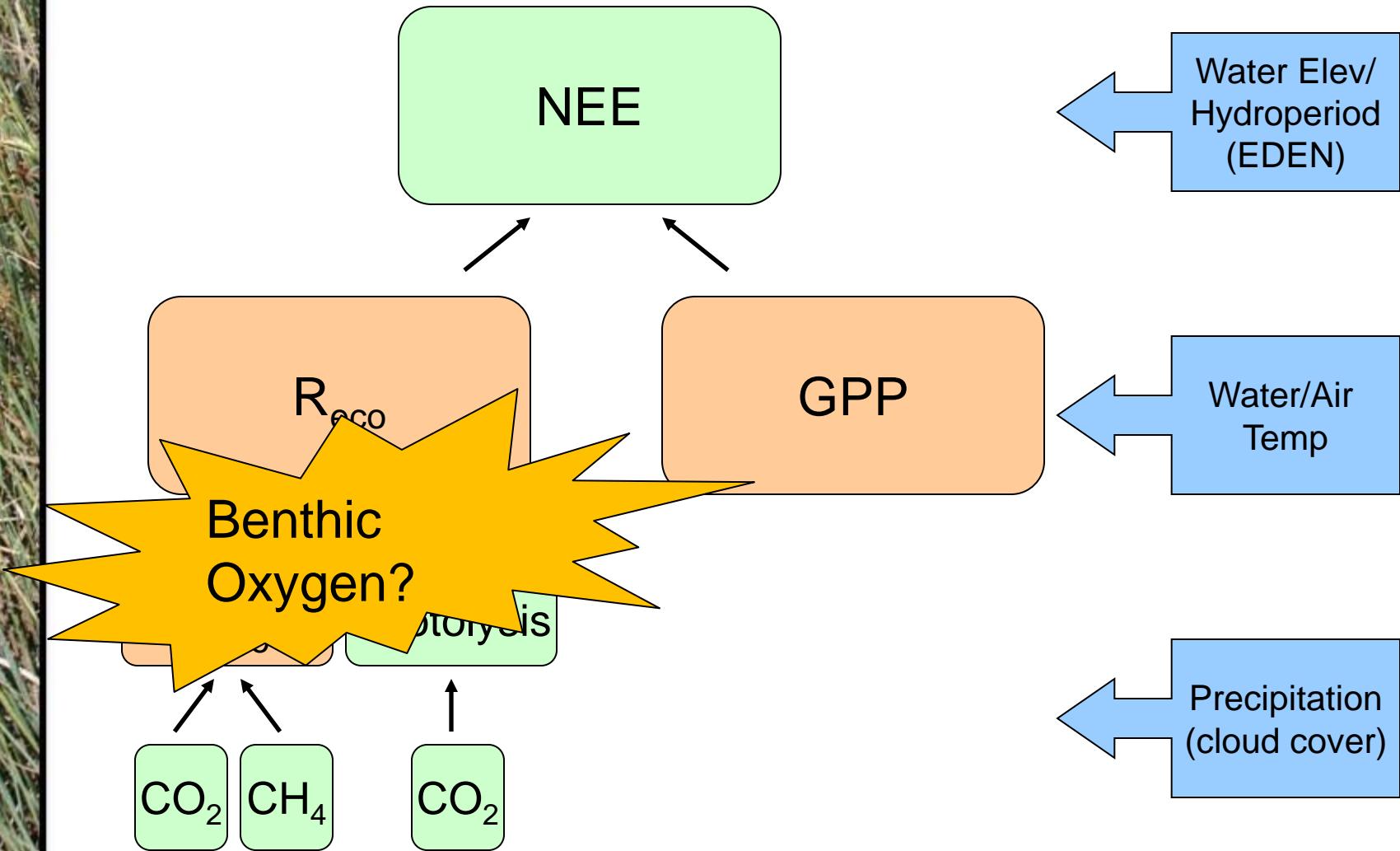


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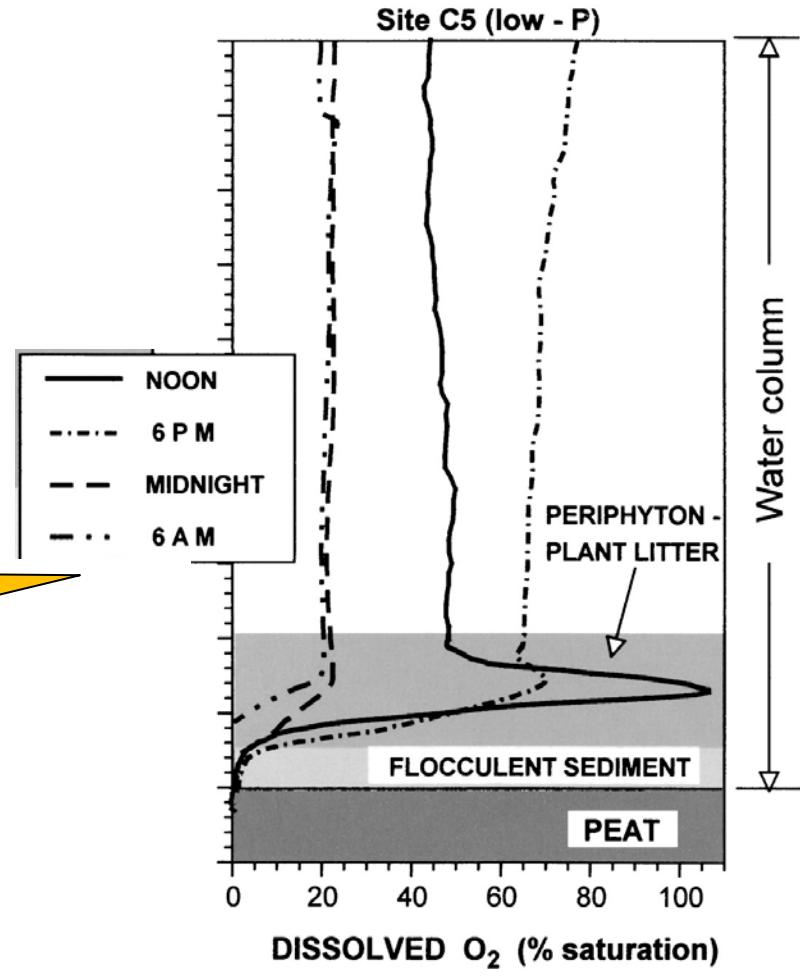
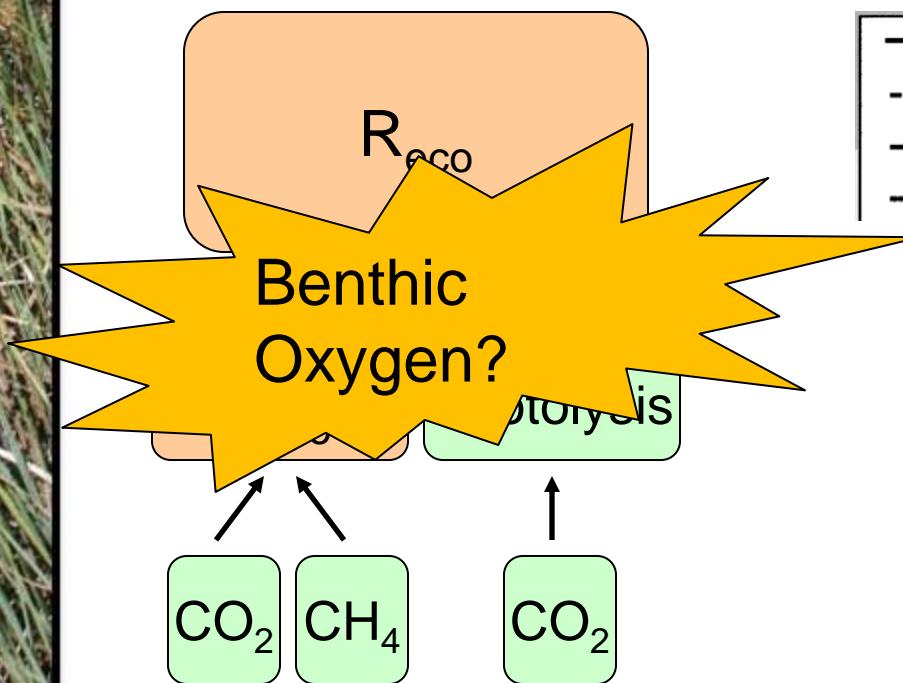


Peat accretion is the result of biotically-mediated carbon fluxes





Peat accretion is the result of biotically-mediated carbon fluxes



Debusk and Reddy 2003

Next: NEE, CH₄, photolysis



Thank you.

Many thanks to:

Todd Osborne (UF SWS)

Jim Heffernan (FIU)



Daoust, R. J., and D. L. Childers. 1998. Quantifying aboveground biomass and estimating net aboveground primary production for wetland macrophytes using a non-destructive phenometric technique. *Journal of Aquatic Botany* 62:115-133.

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